Finding the future: evolving interaction design

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ABSTRACT
The main aim of this project is to design and prototype a simplified example of a mobile operating system that makes use of both edge swipe control and 'smart' graphical instructions. The research will consider how these methods can be used to design a truly inclusive and accessible interface. The effectiveness of these features will be validated through user experiments and focus groups over the course of the project, with the findings of user testing used to inform design practice.

Categories and Subject Descriptors
• Human-centered computing~User centered design • Human-centered computing~Accessibility • *Human~centered computing~HCI theory, concepts and models.*

Keywords
Inclusive Design, Accessibility, Interaction Design, Mobile HCI.

1. BACKGROUND
The idea of considering the changing landscape of HCI design as a type of 'evolution' first arose in our previous research. The concept followed the relationship between the rise in smartphone popularity and the move from skeuomorphic UI design to flat UI design, suggesting that this process reflected the biological process of evolution. This paper and the project outlined within it, aim to continue this process of interface 'evolution' by presenting a radical 'next phase'. The main goal is to demonstrate the potential of an alternate layout and interaction model (Figure 1) for mobile operating systems that emphasises inclusivity and accessibility whilst holding universal appeal for all users.

2. DESIGN FRAMEWORK
This project is design-led, placing strong emphasis on theories and principles of design as well as established design practices. This can be broken down into three distinct areas: firstly inclusive design and accessibility, secondly the principles of interaction design, and thirdly the principles of graphic design as applied to the graphical user interface (GUI). The intention is to design and iterate upon a new approach to mobile interface design that is informed by these concepts.

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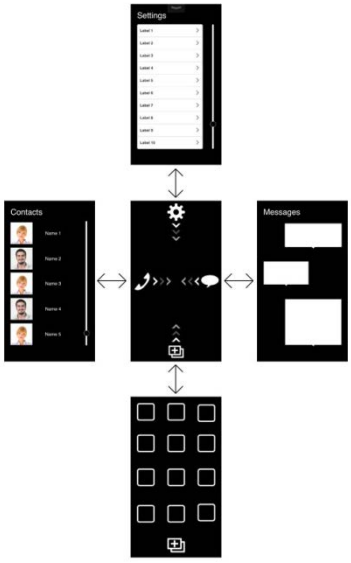

Figure 1. Basic navigation/interaction layout.

2.1 Inclusive Accessibility Design
Today, accessibility within a digital environment typically refers to the interfaces compliance with the needs of the visually impaired. It is a positive step that accessibility is taking more of a centre stage, rather than being a 'bolt-on', however, by focusing on only one problem developers and designers are neglecting the bigger picture. The problem with accessibility is making new technology, not just practical, but pleasurable for everybody to use. The results are often specialised applications rather than core design elements, therefore not inclusive. By focusing on truly inclusive design we hope the implemented solution will avoid obvious focus on solving accessibility issues for a singular specified group and instead use good design to create a result which attempts to cater for, and appeal to, as wide a selection of users as possible.

2.2 Interaction Design
Alongside the previously mentioned rise of minimalist visual style, was an increase in the use of gesture controls that eliminated buttons, and maximised the hardware capabilities of touch-screens. Given the number of gestural interactions now commonplace within most digital environments it seems practical to continue to capitalise upon their increasing popularity. However, rather than applying interaction to an interface design this project will apply an interface design to interaction. By first working out *how* a user will navigate, it is hoped that many of the issues currently surrounding accessibility can be tackled at a barebones level. The main navigational interaction proposed here

is centred on the use of edge swiping (Figure 1). This method eliminates the need for precision as flicking or dragging ones finger along the screen, from edge to centre, in the desired direction will trigger the appropriate response from the device. This feature could not only greatly benefit those with accessibility issues but also provide a quick convenient way to navigate the basic built in features required of today's mobile OS.

2.3 GUI Design

Secondary to this is the use of 'smart' graphical instructions and icons, again building upon current trends in minimalist design, but also with deeper resonations to the ideal of simplicity [2]. Easing the 'mental cost' [3] to the user by presenting instructional information as quickly and clearly as possible, using visual rather than textual methods, results in the perception of a more natural, pleasurable experience. Within the presentation of visual instruction, the interface will rely on the power of suggestion. Currently this has taken the form of intelligent animated arrows that use a time vs use algorithm to determine if they need to be present on screen and for how long. Again for screen reading, the system aims for simplicity and minimisation of options for a less cluttered interface. In terms of the screen reading design the OS will seek to present the information in a more human way rather than simply reading the Meta-data attached to the images.

3. METHODOLOGY

The overall methodology makes use of quantitative, qualitative, and design-based research. This mixed method framework was based upon Creswell's "Transformative" model as illustrated in Designing and Conducting Mixed Methods Research (2003, p.129) [3]. The model follows a sequential path with two distinct phases (Figure 2). This mixed methods approach allowed for issues of accessibility and cognition of mobile interfaces to be explored and better understood in the first instance, prior to undertaking research in real-world contexts in order to account for participant's views and experiences. It involves two types of user: one will be fully sighted (full vision with or without optical aids such as glasses and contact lenses), while the other will be visually impaired (any detrimental visual impairment including but not limited to low vision, severe colour blindness, and total blindness). Whilst this grouping initially contradicts the earlier desire not to focus on a specific accessibility need, it is the best suited for ensuring that the layout is navigational via audio output. Common concerns of other 'accessibility' groups will be assessed and re-assessed during further design iterations.

4. SUMMARY

To this day, many of the accessibility improvements which have been made within mobile HCI design remain flawed due to their tendency to exclude or discount certain user groups. It appears most of the work is being put in to solving specific problems faced by selected groups of people, rather than considering the experience of users a whole. Although these users have differing needs, there is no reason why good design cannot cater for them, without having to make 'special allowances'. With this in mind, the next steps of this investigation will offer the chance to approach accessible mobile interface design from a qualitative perspective. This will allow us to consider the experience of different user groups, ensuring that all groups find the interface both accessible and pleasing to use. This research will highlight the importance of inclusive design in creating a less segregated digital society.

Figure 2. Mixed methods model.

5. REFERENCES

[1] Creswell, J.W., Plano Clark, V.L. 2011. *Designing and Conducting Mixed Methods Research*. 2nd ed. SAGE Publications; Thousand Oaks, California.

[2] Segall, K. 2012. *Insanely Simple: The Obsession the Drives Apple's Success*. 1st ed. Penguin; UK.

[3] Tidwell, J. 2010. *Designing Interfaces*. 2nd ed. O'Reilly Media; Sebastopol.